

WHAT IS CLAIMED IS:

1. A method of manufacturing an image displaying apparatus, comprising the steps of:

5 *Sub A2* a: preparing a first substrate on which phosphor exciting means is disposed and a second substrate on which phosphors emitting light by said phosphor exciting means is disposed under the vacuum atmosphere;

10 b: carrying one or both of said first and second substrates into a getter processing chamber in the vacuum atmosphere under the vacuum atmosphere, and subjecting to getter processing said one substrate carried, or one or both of said substrates carried; and

15 c: carrying said first and second substrates into a seal processing chamber in the vacuum atmosphere under the vacuum atmosphere, and heat sealing said substrates in an opposing state.

20 2. A method of manufacturing an image displaying apparatus according to claim 1, wherein said steps a, b and c are steps set on one line.

25 3. A method of manufacturing an image displaying apparatus according to claim 1, wherein said steps a, b and c are steps set on one line, and a heat shielding member is disposed between said getter processing chamber and said seal processing chamber.

4. A method of manufacturing an image displaying apparatus according to claim 3, wherein said heat shielding member is formed of reflective metal.

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5. A method of manufacturing an image displaying apparatus according to claim 1, wherein said steps a, b and c are steps set on one line, and a load lock is disposed between said getter processing chamber and said seal processing chamber.

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6. A method of manufacturing an image displaying apparatus according to claim 1, wherein said steps a, b and c are steps set on a star arrangement.

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7. A method of manufacturing an image displaying apparatus according to claim 1, wherein said steps a, b and c are steps set on a star arrangement, and said getter processing chamber and said seal processing chamber are partitioned by an independent chamber.

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8. A method of manufacturing an image displaying apparatus according to claim 1, wherein said phosphor exciting means has electron beam emitting means.

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9. A method of manufacturing an image displaying apparatus according to claim 1, wherein said first substrate has an envelope fixedly disposed around said

first substrate in advance.

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10. A method of manufacturing an image displaying apparatus according to claim 1, wherein said first substrate has a spacer fixedly disposed inside said first substrate in advance.

10 11. A method of manufacturing an image displaying apparatus according to claim 1, wherein said first substrate has an envelope fixedly disposed around said first substrate and a spacer fixedly disposed inside said first substrate.

15 12. A method of manufacturing an image displaying apparatus according to claim 1, wherein said second substrate has an envelope fixedly disposed around said second substrate in advance.

20 13. A method of manufacturing an image displaying apparatus according to claim 1, wherein said second substrate has a spacer fixedly disposed inside said second substrate in advance.

25 14. A method of manufacturing an image displaying apparatus according to claim 1, wherein said second substrate has an envelope fixedly disposed around said second substrate and a spacer fixedly disposed inside

said first substrate.

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15. A method of manufacturing an image displaying apparatus according to claim 1, wherein said getter used in the step b is an evaporation type getter.

16. A method of manufacturing an image displaying apparatus according to claim 1, wherein said evaporation type getter is a barium getter.

17. A method of manufacturing an image displaying apparatus according to claim 1, wherein said sealing material used in the step c is a low melting point material.

18. A method of manufacturing an image displaying apparatus according to claim 17, wherein said low melting point material is a low melting point metal or an alloy of such a metal.

19. A method of manufacturing an image displaying apparatus according to claim 18, wherein said low melting point metal is indium or an alloy of indium.

20. A method of manufacturing an image displaying apparatus according to claim 17, wherein said low melting point material is frit glass.

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24. A method of manufacturing an image displaying

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35. A method of manufacturing an image displaying apparatus according to claim 21, wherein said sealing material used in the step c is a low melting point material.

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36. A method of manufacturing an image displaying apparatus according to claim 35, wherein said low melting point material is a low melting point metal or an alloy of such a metal.

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37. A method of manufacturing an image displaying apparatus according to claim 36, wherein said low melting point metal is indium or an alloy of indium.

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38. A method of manufacturing an image displaying apparatus according to claim 35, wherein said low melting point material is frit glass.

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39. A method of manufacturing an image displaying apparatus, comprising the steps of:

a: preparing a first substrate on which phosphor exciting means is disposed and a second substrate on which phosphors emitting light by said phosphor exciting means is provided under the vacuum atmosphere;

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b: carrying said first and second substrates into a bake processing chamber in the vacuum atmosphere under the vacuum atmosphere and subjecting to bake



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42. A method of manufacturing an image displaying

apparatus according to claim 41, wherein said heat shielding member is formed of a reflective metal.

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43. A method of manufacturing an image displaying apparatus according to claim 39, wherein the steps a, b, c and d are steps set on one line, and a load lock is disposed said bake processing chamber and said getter processing chamber, between said bake processing chamber and said seal processing chamber, or between said bake processing chamber, said getter processing chamber and said seal processing chamber, respectively.

44. A method of manufacturing an image displaying apparatus according to claim 39, wherein the steps a, b, c and d are steps set on a star arrangement.

45. A method of manufacturing an image displaying apparatus according to claim 39, wherein the steps a, b, c and d are arranged on a star arrangement, and said bake processing chamber, said getter processing chamber and said seal processing chamber are partitioned by an independent chamber.

46. A method of manufacturing an image displaying apparatus according to claim 39, wherein said phosphor exciting means has electron beam emitting means.

47. A method of manufacturing an image displaying apparatus according to claim 39, wherein said first substrate has an envelope fixedly disposed around said first substrate in advance.

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48. A method of manufacturing an image displaying apparatus according to claim 39, wherein said first substrate has a spacer fixedly disposed inside said first substrate in advance.

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49. A method of manufacturing an image displaying apparatus according to claim 39, wherein said first substrate has an envelope fixedly disposed around said first substrate and a spacer fixedly disposed inside said first substrate.

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50. A method of manufacturing an image displaying apparatus according to claim 39, wherein said second substrate has an envelope fixedly disposed around said second substrate in advance.

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51. A method of manufacturing an image displaying apparatus according to claim 39, wherein said second substrate has a spacer fixedly disposed inside said second substrate in advance.

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52. A method of manufacturing an image displaying

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57. A method of manufacturing an image displaying apparatus according to claim 56, wherein said low melting point metal is indium or an alloy of indium.

58. A method of manufacturing an image displaying apparatus according to claim 55, wherein said low melting point material is frit glass.

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59. A method of manufacturing an image displaying apparatus, comprising the steps of:

10 a: preparing a first substrate on which phosphor exciting means is disposed and a second substrate on which phosphors emitting light by said phosphor exciting means is disposed under the vacuum atmosphere;

15 b: carrying said first and second substrates into a bake processing chamber in the vacuum atmosphere under the vacuum atmosphere and subjecting to bake processing both said substrates at predetermined temperature;

20 c: carrying one or both of said first and second substrates into a first getter processing chamber in the vacuum atmosphere under the vacuum atmosphere, and subjecting to first getter processing said one substrate carried or one or both of said substrates carried;

25 d: carrying one or both of said first and second substrates into an electron beam clean processing chamber in the vacuum atmosphere under the vacuum atmosphere, and subjecting to electron beam clean processing said one substrate carried or one or both of said substrates carried;

e: carrying one or both of said first and second substrates into a second getter processing chamber in the vacuum atmosphere under the vacuum atmosphere, and subjecting to second getter processing said one substrate carried or one or both of said substrates carried; and

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f: carrying said first and second substrates into a seal processing chamber in the vacuum atmosphere under the vacuum atmosphere, and heat sealing said substrates in an opposing state.

60. A method of manufacturing an image displaying apparatus according to claim 59, wherein said steps a, b, c, d, e and f are steps set on one line.

61. A method of manufacturing an image displaying apparatus according to claim 59, wherein the steps a, b, c, d, e and f are steps set on one line, and a heat shielding member is disposed between said bake processing chamber and said first getter processing chamber, between said first getter processing chamber and said electron beam clean processing chamber, between said electron beam clean processing chamber and said second getter processing chamber, or between said second getter processing chamber and said seal processing chamber.

62. A method of manufacturing an image displaying apparatus according to claim 61, wherein said heat shielding member is formed of a reflective metal.

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63. A method of manufacturing an image displaying apparatus according to claim 59, wherein the steps a, b, c, d, e and f are steps set on one line, and a load lock is disposed between said bake processing chamber and said first getter processing chamber, between said  
10 first getter processing chamber and said electron beam clean processing chamber, between said electron beam clean processing chamber and said second getter processing chamber, or between said second getter processing chamber and said seal processing chamber.

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64. A method of manufacturing an image displaying apparatus according to claim 59, wherein the steps a, b, c, d, e and f are set on a star arrangement.

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65. A method of manufacturing an image displaying apparatus according to claim 59, wherein the steps a, b, c, d, e and f are set on a star arrangement, and said bake processing chamber, said first getter  
25 processing chamber, said electron beam clean processing chamber, said second getter processing chamber and said seal processing chamber are partitioned by independent chambers.

66. A method of manufacturing an image displaying apparatus according to claim 59, wherein said phosphor exciting means has electron beam emitting means.

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67. A method of manufacturing an image displaying apparatus according to claim 59, wherein said first substrate has an envelope fixedly disposed around said first substrate in advance.

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68. A method of manufacturing an image displaying apparatus according to claim 59, wherein said first substrate has a spacer fixedly disposed inside said first substrate in advance.

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69. A method of manufacturing an image displaying apparatus according to claim 59, wherein said first substrate has an envelope fixedly disposed around said first substrate and a spacer fixedly disposed inside said first substrate.

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70. A method of manufacturing an image displaying apparatus according to claim 59, wherein said second substrate has an envelope fixedly disposed around said second substrate in advance.

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71. A method of manufacturing an image displaying apparatus according to claim 59, wherein said second



substrate has a spacer fixedly disposed inside said second substrate in advance.

5 72. A method of manufacturing an image displaying apparatus according to claim 59, wherein said second substrate has an envelope fixedly disposed around said second substrate and a spacer fixedly disposed inside said first substrate.

10 73. A method of manufacturing an image displaying apparatus according to claim 59, wherein said getter used in the steps b and d is an evaporation type getter.

15 74. A method of manufacturing an image displaying apparatus according to claim 73, wherein said evaporation type getter is a barium getter.

20 75. A method of manufacturing an image displaying apparatus according to claim 59, wherein said sealing material used in the step e is a low melting point material.

25 76. A method of manufacturing an image displaying apparatus according to claim 75, wherein said low melting point material is a low melting point metal or an alloy of such a metal.

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77. A method of manufacturing an image displaying apparatus according to claim 76, wherein said low melting point metal is indium or an alloy of indium.

5 78. A method of manufacturing an image displaying apparatus according to claim 75, wherein said low melting point material is frit glass.

10 79. An apparatus for manufacturing an image displaying apparatus, comprising:

a: a conveying means for conveying a first substrate provided with a first member for an image displaying apparatus and a second substrate provided with a second member for an image displaying apparatus;

15 b: a first vacuum chamber in which one or both of said first and second substrates can be carried under the vacuum atmosphere by the conveying means;

20 c: getter giving means arranged in said first vacuum chamber having a getter precursor and getter activating means for activating said getter precursor;

d: a second vacuum chamber in which said first and second substrates can be carried under the vacuum atmosphere by the conveying means;

25 e: substrate arranging means, arranged in said second vacuum chamber, for arranging said first and second substrates in positions opposite to each other by orienting said first and second members for an image

displaying apparatus toward inside; and

f: sealing means, arranged in said second vacuum chamber, for heat sealing said first and second substrates arranged in opposing positions by said substrate arranging means at predetermined temperature.

80. A manufacturing apparatus according to claim 79, wherein said first vacuum chamber and said second vacuum chamber are arranged on one line.

81. A manufacturing apparatus according to claim 79, wherein said first vacuum chamber and said second vacuum chamber are arranged on one line, and each chamber is partitioned by a heat shielding member.

82. A manufacturing apparatus according to claim 79, wherein said first vacuum chamber and said second vacuum chamber are arranged on one line, and each chamber is partitioned by a load lock.

83. A manufacturing apparatus according to claim 79, wherein said first vacuum chamber and said second vacuum chamber are arranged in a star arrangement, and each chamber is partitioned by an independent chamber.

84. An apparatus for manufacturing an image displaying apparatus, comprising:

5           b: a first vacuum chamber in which said first and  
second substrates can be carried under the vacuum  
atmosphere by the conveying means;

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15 e: substrate arranging means, arranged in said second vacuum chamber, for arranging said first and second substrates in positions opposite to each other by orienting said first and second members for an image displaying apparatus toward inside; and

25            85. A manufacturing apparatus according to claim  
84, wherein said first vacuum chamber and said second  
vacuum chamber are arranged on one line.

86. A manufacturing apparatus according to claim 85, wherein said first vacuum chamber and said second vacuum chamber are arranged on one line, and each chamber is partitioned by a heat shielding member.

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87. A manufacturing apparatus according to claim 85, wherein said first vacuum chamber and said second vacuum chamber are arranged on one line, and each chamber is partitioned by a load lock.

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88. A manufacturing apparatus according to claim 85, wherein said first vacuum chamber and said second vacuum chamber are arranged in a star arrangement, and each chamber is partitioned by an independent chamber.

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89. An apparatus for manufacturing an image displaying apparatus, comprising:

a: a conveying means for conveying a first substrate provided with a first member for an image displaying apparatus and a second substrate provided with a second member for an image displaying apparatus;

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b: a first vacuum chamber in which said first and second substrates can be carried under the vacuum atmosphere by the conveying means;

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c: baking means, arranged in said first vacuum chamber, for bake processing said carried first and second substrates by heating said first and second

substrates;

d: a second vacuum chamber in which said first and second substrates can be carried under the vacuum atmosphere by the conveying means;

5 e: getter giving means arranged in said second vacuum chamber having a getter precursor and getter activating means for activating said getter precursor;

f: a third vacuum chamber in which said first and second substrates can be carried under the vacuum atmosphere by the conveying means;

10 g: substrate arranging means, arranged in said third vacuum chamber, for arranging said first and second substrates in positions opposite to each other by orienting said first and second members for an image displaying apparatus toward inside; and

15 h: sealing means, arranged in said third vacuum chamber, for heat sealing said first and second substrates arranged in opposing positions by said substrate arranging means at predetermined temperature.

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90. A manufacturing apparatus according to claim 89, wherein said first vacuum chamber, said second vacuum chamber and said third vacuum chamber are arranged on one line.

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91. A manufacturing apparatus according to claim 89, wherein said first vacuum chamber, said second

vacuum chamber and said third vacuum chamber are arranged on one line, and each chamber is partitioned by a heat shielding member.

5           92. A manufacturing apparatus according to claim 89, wherein said first vacuum chamber, said second vacuum chamber and said third vacuum chamber are arranged on one line, and each chamber is partitioned by a load lock.

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          93. A manufacturing apparatus according to claim 89, wherein said first vacuum chamber, said second vacuum chamber and said third vacuum chamber are provided in a star arrangement, and each chamber is partitioned by an independent chamber.

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          94. An apparatus for manufacturing an image displaying apparatus, comprising:

          a: a conveying means for conveying a first  
20       substrate provided with a first member for an image displaying apparatus and a second substrate provided with a second member for an image displaying apparatus;

          b: a first vacuum chamber in which said first and second substrates can be carried under the vacuum  
25       atmosphere by the conveying means;

          c: baking means, arranged in said first vacuum chamber, for bake processing said carried first and

second substrates by heating said first and second substrates;

d: a second vacuum chamber in which said first and second substrates can be carried under the vacuum atmosphere by the conveying means;

e: getter giving means arranged in said second vacuum chamber having a getter precursor and getter activating means for activating said getter precursor;

f: a third vacuum chamber in which one or both of said first and second substrates can be carried under the vacuum atmosphere by said conveying means;

g: electron beam cleaning means, arranged in said third vacuum chamber, for applying electron beam clean processing by irradiating electron beams;

h: a fourth vacuum chamber in which one or both of said first and second substrates can be carried under the vacuum atmosphere by said conveying means;

i: second getter giving means arranged in said fourth vacuum chamber having a getter precursor and getter activating means for activating said getter precursor;

j: a fifth vacuum chamber in which one or both of said first and second substrates can be carried under the vacuum atmosphere by said conveying means;

k: substrate arranging means, arranged in said fifth vacuum chamber, for arranging said first and second substrates in positions opposite to each other



by orienting said first and second members for an image displaying apparatus toward inside; and

1: sealing means, arranged in said fifth vacuum chamber, for heat sealing said first and second  
5 substrates arranged in opposing positions by said substrate arranging means at predetermined temperature.

95. A manufacturing apparatus according to claim  
94, wherein said first vacuum chamber, said second  
10 vacuum chamber, said third vacuum chamber, said fourth vacuum chamber and said fifth vacuum chamber are arranged on one line.

96. A manufacturing apparatus according to claim  
15 94, wherein said first vacuum chamber, said second vacuum chamber, said third vacuum chamber, said fourth vacuum chamber and said fifth vacuum chamber are arranged on one line, and each chamber is partitioned  
by a heat shielding member.

20 97. A manufacturing apparatus according to claim 94, wherein said first vacuum chamber, said second vacuum chamber, said third vacuum chamber, said fourth vacuum chamber and said fifth vacuum chamber are  
25 arranged on one line, and each chamber is partitioned by a load lock.

98. A manufacturing apparatus according to claim 94, wherein said first vacuum chamber, said second vacuum chamber, said third vacuum chamber, said fourth vacuum chamber and said fifth vacuum chamber are provided in a star arrangement, and each chamber is partitioned by an independent chamber.

99. A manufacturing apparatus according to any one of claims 79, 84, 89 and 94, wherein said first member for an image displaying apparatus is an electron beam emitting device, and said second member for an image displaying apparatus is a phosphor.

100. An apparatus for manufacturing an image displaying apparatus, comprising:

a: a conveying means for conveying a first substrate provided with a first member for an image displaying apparatus and a second substrate provided with a second member for an image displaying apparatus;

b: a first decompression chamber in which said first substrate carried in by said conveying means can be carried without being exposed to the atmosphere while maintaining a decompressed state;

c: getter giving means arranged in said first decompression chamber having a getter precursor and getter activating means for activating said getter precursor;

5           e: substrate arranging means, arranged in said second decompression chamber, for arranging said first and second substrates in positions opposite to each other by orienting said first and second members for an image displaying apparatus toward inside; and

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c: getter giving means arranged in said first  
decompression chamber having a getter precursor and

getter activating means for activating said getter precursor;

d: a second decompression chamber in which said first and second substrates in said first decompression chamber can be carried without being exposed to the atmosphere;

e: substrate arranging means, arranged in said second decompression chamber, for arranging said first and second substrates in positions opposite to each other by orienting said first and second members for an image displaying apparatus toward inside; and

f: sealing means, arranged in said second decompression chamber, for sealing said first and second substrates arranged in opposing positions by said substrate arranging means by heating said first and second substrates at predetermined temperature.

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102. An apparatus for manufacturing an image displaying apparatus, comprising:

a: a conveying means for conveying a first substrate provided with a first member for an image displaying apparatus and a second substrate provided with a second member for an image displaying apparatus;

b: a first decompression chamber in which said first and second substrates carried in by said conveying means can be carried without being exposed to the atmosphere while maintaining a decompressed state;

c: baking means, arranged in said first decompression chamber, for bake processing said carried first and second substrates by heating said substrates;

5 d: first getter giving means, arranged in said first decompression chamber or a second decompression chamber in which said first and second substrates can be carried from said first decompression chamber without being exposed to the atmosphere, having a getter precursor and getter activating means for  
10 activating said getter precursor;

e: a third decompression chamber in which said first and second substrates can be carried from said first or second decompression chamber without being exposed to the atmosphere; A

15 f: substrate arranging means, arranged in said third decompression chamber, for arranging said first and said second substrates in positions opposite to each other by orienting said first and second members for an image displaying apparatus toward inside; and

20 g: sealing means, arranged in said third decompression chamber, for sealing said first and second substrates arranged in opposing positions by said substrate arranging means by heating said first and second substrates at predetermined temperature.

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103. An apparatus for manufacturing an image displaying apparatus, comprising:

a: a conveying means for conveying a first substrate provided with a first member for an image displaying apparatus and a second substrate provided with a second member for an image displaying apparatus;

5        b: a first decompression chamber in which said first and second substrates carried in by the conveying means can be carried without being exposed to the atmosphere while maintaining a decompressed state;

10       c: baking means, arranged in said first decompression chamber, for bake processing said carried first and second substrates by heating said substrates;

15       d: first getter giving means, arranged in said first decompression chamber or a second decompression chamber in which said first and second substrates can be carried from said first decompression chamber without being exposed to the atmosphere, having a getter precursor and getter activating means for activating said getter precursor;

20       e: a third decompression chamber in which said first and second substrates can be carried from said first or second decompression chamber without being exposed to the atmosphere;

25       f: electron beam cleaning means, arranged in said third decompression chamber, for cleaning said first and said second substrates by irradiating electron beams to said first and second substrates;

g: a fourth decompression chamber in which said

first and second substrates can be carried from said third decompression chamber without being exposed to the atmosphere;

h: second getter giving means, arranged in said fourth decompression chamber, having a getter precursor and getter activating means for activating said getter precursor;

i: a fifth decompression chamber in which said first and second substrates can be carried from said fourth decompression chamber without being exposed to the atmosphere;

j: substrate arranging means, arranged in said fifth decompression chamber, for arranging said first and second substrates in positions opposite to each other by orienting said first and second members for an image displaying apparatus toward inside; and

k: sealing means, arranged in said fifth decompression chamber, for sealing said first and second substrates arranged in opposing positions by said substrate arranging means by heating said first and second substrates at predetermined temperature.

104. A manufacturing apparatus according to any one of claims 100 through 103, wherein said first decompression chamber contains inert gasses or hydrogen gas under decompression.

105. A manufacturing apparatus according to any one of claims 100 through 103, wherein said second decompression chamber contains inert gasses or hydrogen gas under decompression.

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106. A manufacturing apparatus according to any one of claims 100 through 103, wherein said third decompression chamber contains inert gasses or hydrogen gas under decompression.

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107. A manufacturing apparatus according to any one of claims 100 through 103, wherein said fourth decompression chamber contains inert gasses or hydrogen gas under decompression.

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108. A manufacturing apparatus according to any one of claims 100 through 103, wherein said fifth decompression chamber contains inert gasses or hydrogen gas under decompression.

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109. A manufacturing apparatus according to any one of claims 100 through 103, wherein said first member for an image displaying apparatus is a plasma generating device, and said second member for an image displaying apparatus is a phosphor or a color filter.

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